
II. *Microſcopical Obſervations upon the Configuration of Diamonds: In a Letter from Mr.* Antony Van Leeuwenhoek, *F. R. S.*

Honourable Gentlemen,

I Take the Liberty of troubling you again with theſe my following Obſervations, which I have had lain by me theſe three Years, within which time I cauſed them to be delineated by my Painter, and engraven upon a Copper-Plate; the Draught of which I here ſend You.

I have been often ask'd, whether I could diſcover any thing particular in the Configuration of Diamonds; whereupon ſome Years ago, I took a ſmall poliſh'd Diamond, and broke it to Pieces with a Pair of Pincers; but having obſerved nothing more in the broken Particles thereof, than in thoſe of Common Glaſs, I laid aſide all Thoughts of it for that time.

Some Months ago it came into my Head, that I ſhou'd have made my Remarks not upon poliſh'd, but ruff Diamonds.

Whereupon I procur'd a few ſmall ruff Diamonds from a Jeweller, ſome of which I placed before a Microſcope, and obſerved one of them more particularly; concerning which I concluded, that all thoſe Streaks or Fibres which I ſaw in it, were nothing more than the ſeveral Coagulations or Augmentations it had receiv'd from time to time, and that in a very ſhort ſpace.

Fig. 1. A. B. C. D. E. F. repreſents a ſmall Particle of a little Diamond, as it appear'd thro' a Microſcope; in which between A. and B. as alſo between C. D. E. and F. you may obſerve a great Number of Lines or Fibres in the ſaid Diamond; each of which Fibres was occaſion'd as I ſuppoſe by the Increaſe or Acceſſion of new Mattter, which whether it was form'd in one Day or more, is not much to the purpoſe.

Now that the increaſe of Diamonds is made in ſuch an Order and Manner, we may conclude the rather, becauſe we are ſure that the ſame thing happens in the Coagulation of many Salts.

I have taken ſome of theſe Particles ſeveral times, and laid them upon burning Wood-Coals 'till they were red hot, and in that Condition thrown them into the Water, to ſee whether they wou'd burſt to Pieces, or whether there wou'd be any ſeparation of Matter from them; but that never happening, I muſt conclude that there was no Air nor any Moiſture ſhut np within them.

One Particle of a Diamond appear'd to the Sight, as *Fig.* 2. G. H. I. K. L. after I had made it red hot, and ſlaked it in Water ſeveral times; in this alſo, between L. and G. you may obſerve ſeveral ſmall Streaks or Fibres: and when I obſerved it the laſt time, after I had taken it out of the Water, it appear'd betweea L. G. H. and I. juſt as if ſome ſmall Scales had been ſeparated from it; juſt like the ſhining or gliſtering Parts which I have often ſeen in ſeveral Stones, and particularly in the great Flint-Stone that is brought in Ships from *Greenland* for Ballaſt, when the Whale-Fiſhing is not good, and when its Chryſtalline or Diamond Tranſparency is gone.

Fig. 3. M. N. O. P. Q. R. repreſents alſo a Particle of a Diamond, as it appear'd thro' the Microſcope, after it had been made ſeveral times red hot and thrown into

cold

cold Water; in the middle of which one might perceive ſuch Slits or Cracks as one might compare to the Top or Cieling of an Unwainſcotted Church within ſide, which was no unpleaſant Spectacle, but cou'd not be ſo well traced by the Painter as it ought to have been; but whe- this Appearance be natural to the Diamond, or whether it proceeds from the breaking it in Pieces, is unknown to me; but my Opinion is, that it was not occaſion'd by its being made red hot, and thrown afterwards into the Water, for if it had been ſo, the Diamond wou'd have been ſeparated into a great many Particles, or one wou'd have diſcovered ſeveral Cracks or Flaws in it: For a certain Goldſmith having bought ſeveral ſmall Stones for Diamonds, and which many People wou'd have taken for precious Stones, he gave me three or four of them to view, and I preſently judged them not to be Diamonds, for they had neither ſharp Points nor ſmooth Sides, but appeared like tranſparent Particles of Sand, whoſe Angles or Points were worn off; he allow'd me alſo to make them red hot, and to throw them into the Water afterwards, which I did, and obſerved by the help of my Microſcope, that they had got a great many Rents or Cracks in them, inſomuch that with a little ſqueezing they wou'd crumble all to Pieces.

Fig. 4. S. T. V. W. X. Y. repreſents the ſmall Particle of a Diamond, no bigger to the naked Eye than a ſmall Grain of Sand, from whence you may judge alſo of the largeneſs of the other Diamond Particles, repreſented by the preceeding Figures; this laſt mention'd Particle was not put into the Fire. You may alſo obſerve at S. T. V. W. and Y. the ſharp Points of the ſaid Particle.

From whence I conclude, that I was right in my former Remarks concerning the Particles of Sand; to wit, that the ſaid very ſmall Particles conſiſting of regular

Points and ſmooth ſides like Diamonds, were ſoft at their firſt Coagulation, but grew greater and larger by the Acceſſion of new Matter, 'till they became large Grains of Sand; and moreover, that ſome Diamonds were form'd juſt after the ſame manner.

Now as we find, that in the Diſſolution of Silver by *Aqua fortis*, ſome of the ſmall Silver Particles are Coagulated in Chryſtals of the figure of Diamonds; and that the Sugar which is boiled to a Syrup in order to make Sugar Candy, is alſo Coagulated into ſuch Particles; ſo we may likewiſe ſuppoſe, that at the time when the Diamond Particles coagulate, a great deal of the ſame Matter whereof they are compoſed is in the Air, but not to be perceived by our naked Eye, nor the Quantity thereof to be known 'till it is Coagulated into a Body: And who knows but if a Shovel of that Earth, out of which they dig Diamonds, were brought over and carefully Examin'd by a Microſcope, one might diſcover abundance of exact and compleat little Diamonds of an unſpeakable ſmallneſs.

I know there are a great many People who are of Opinion, that many things lying in the Bowels of the Earth, and eſpecially Diamonds, grow bigger and bigger, and that their Increaſe is occaſioned by ſubterraneous Fires driving the Damps up higher and higher, which Damps they ſay are impregnated or loaden with Mineral, Chryſtalline or Adamantine Particles.

But I am not of that Opinion, for if it were true that an Adamantine Matter were produced by the Subterraneous Fires driving up the Damps, we muſt conclude, that that Matter wou'd be fluid, and then that fluid Matter ſo driven up, wou'd Coagulate with the Diamonds it met in its way, and make them greater; but if that were true, this Adamantine Matter ſo driven up, cou'd not have the Power to diſperſe the Earth or Sand with which the Diamonds

monds were ſurrounded, in order to its own Accreſtion or Coalition therewith, but this Coagulating Adamantine Matter wou'd involve Earth, Sand, or whatever other Particles lay in its way, by which means there would be no ſuch Thing as a clear and clean Diamond digg'd out of the Earth.

I know that there are ſome ruff Diamonds in and about which there is an earthy Matter, but that does not ſeem ſtrange to me, becauſe it happens, as I imagine, in the very Coagulation of the Diamonds, and when the Parts thereof were ſoft.

Among ſeveral Hexangular Pieces of Rock-Chryſtal, I have obſerved ſome whoſe ſides appear'd very ſmooth to the naked Eye, and whoſe Points did not at all reſemble Chryſtal, but rather a dark Earth; which I conceive to be only occaſion'd by the neighbouring Earth's inſinuating itſelf into the Points of the ſaid Chryſtal, at its firſt Coagulation, and when it was ſoft.

Let us now ſuppoſe a Diamond lying in the Earth, and growing continually greater, whoſe Axis was the 4th part of an Inch, or 150 Hairs breadth, and that ſuch a Diamond in the ſpace of Ten Years was ſo much encreas'd, that its Axis or the Bigneſs of its Body was augmented on every ſide half a Hairs breadth, and ſo proportionably every Ten Years; by conſequence then in the ſpace of 3000 Years its Axis wou'd be Three Hundred Hairs breadth greater, by which means the Diamond wou'd be Twenty Seven Times bigger than at firſt.

Now if we ſuppoſe, that a Diamond in the ſpace of Ten Years does increaſe on all ſides a Hairs breadth, its Axis wou'd be two Hairs breadth, which in 3000 Years wou'd be 750 Hairs breadth, and then the laſt mention'd Diamond wou'd be 125 times bigger than the Diamond whoſe Axis was 150 Hairs breadth: Now ſuppoſing a Diamond whoſe Axis was 150 Hairs breadth, and its

Weight

Weight 7 Carrats, what a prodigious Diamond wou'd that be whoſe Axis is 750 Hairs breadth, and where ſhall we find ſuch a Diamond ? I hope that your Honours will find ſomething in theſe Obſervations which may be acceptable to you, and in the mean time I ſhall remain,

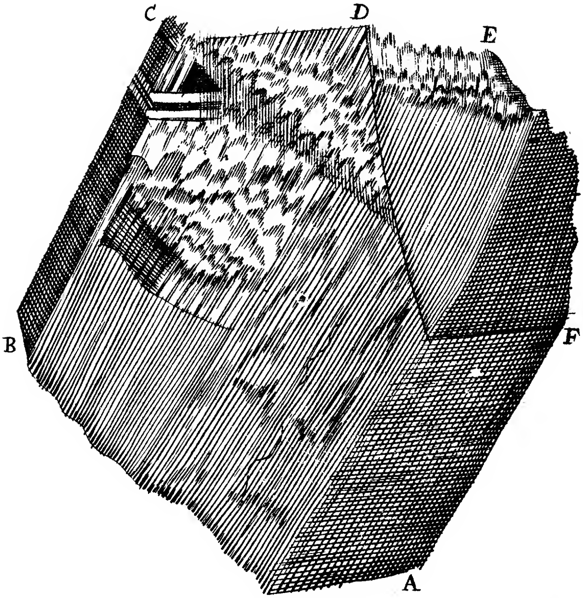
Honourable Gentlemen,

Your moſt Humble Servant,

Antony van Leeuwenhoek.

Philos: Transact: N:324.

Fig: I.



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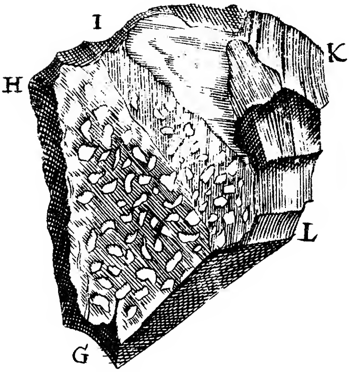

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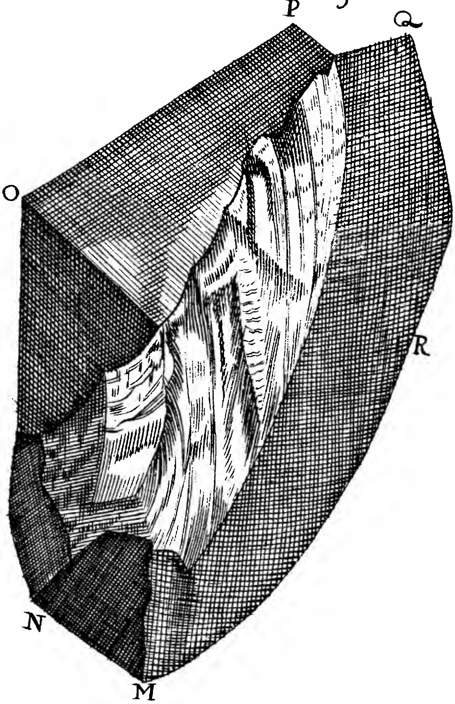

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